

WHAT IS CLAIMED IS:

1. In a cable modem, a method of scanning a plurality of channels for a carrier frequency of a digital data signal, the digital data signal being received on one of a group of frequencies in one of the plurality of channels, the method comprising:

5 sequentially scanning nonadjacent frequencies in the group of frequencies, wherein each scan of a nonadjacent frequency is capable of detecting energy indicative of the digital data signal from the nonadjacent frequency and from frequencies that are adjacent thereto.

10 2. The method according to Claim 1, further comprising: scanning the frequencies that are adjacent thereto to thereby identify a frequency at which the carrier frequency is located, in response to detecting energy indicative of the digital data signal from the nonadjacent frequency and from frequencies that are adjacent thereto.

15 3. The method according to Claim 1, wherein the sequentially scanning comprises:

dividing the group of frequencies into a plurality of sets of frequencies at which the carrier frequency may be located, wherein frequencies of each set are
20 interleaved with frequencies of other sets; and sequentially scanning the frequencies of each set.

4. The method according to Claim 3, wherein the group of frequencies are divided into a first set and a second set, and wherein the frequencies of the second
25 set are interleaved with frequencies of the first set.

5. The method according to Claim 3, wherein the group of frequencies are divided into a first set, a second set, and a third set, and wherein the frequencies of the second and third sets are interleaved with frequencies of the first set.

30 6. The method according to Claim 4, wherein a first frequency in the first set is adjacent second and third frequencies of the second set and wherein the sequentially scanning comprises:

scanning the first frequency to detect a digital data signal; and

scanning the second and third frequencies in the vicinity of the first frequency, if scanning the first frequency results in detection of energy indicative of the digital data signal at the second or third frequencies.

5 7. The method according to Claim 1, wherein the digital data signal is a DOCSIS signal.

8. The method of scanning according to Claim 4, further comprising scanning the second set of frequencies to attempt to detect the digital data signal, if
10 scanning the first set of frequencies fails to identify the carrier frequency of the digital data signal

9. In a cable modem, a method of scanning a channel for a carrier frequency of a digital data signal within the channel, the channel including a set of
15 potential carrier frequencies, the method comprising:

sequentially scanning a group of nonadjacent potential carrier frequencies selected from the set of potential carrier frequencies, wherein each scan of a nonadjacent potential carrier frequency is capable of detecting energy indicative of the digital data signal from both the nonadjacent potential carrier frequency and from
20 potential carrier frequencies that are adjacent thereto.

10. The method according to Claim 9, further comprising the step of: individually scanning the frequencies that are adjacent thereto to thereby identify a frequency at which the carrier frequency is located, in response to detecting
25 energy indicative of the digital data signal from the nonadjacent potential carrier frequency and from potential carrier frequencies that are adjacent thereto.

11. The method according to Claim 9, wherein the sequentially scanning comprises:
30 dividing the group of potential carrier frequencies into a plurality of sets, each of the sets comprising a set of discrete frequency values at which the carrier frequency may be located, wherein discrete frequency values of each set are interleaved with discrete frequency values of other sets; and
sequentially scanning the potential carrier frequencies of each set.

12. The method according to Claim 11, wherein the group of potential carrier frequencies are divided into a first set and a second set, and wherein the discrete frequency values of the second set are interleaved with discrete frequency values of the first set.

13. The method according to Claim 11, wherein the group of potential carrier frequencies are divided into a first set, a second set, and a third set, and wherein the discrete frequency values of the second and third sets are interleaved with discrete frequency values of the first set.

14. The method according to Claim 12, wherein the discrete frequency values of the first set include a frequency value and wherein other frequency values are in the vicinity of the frequency value, the method further comprising the steps of:

scanning the frequency value to detect a digital data signal; and

incrementally scanning the other frequency values in the vicinity of the first frequency value until the carrier frequency of the digital data signal is determined, if the step of scanning the frequency value results in detection of energy indicative of the digital data signal.

15. The method according to Claim 9, wherein the digital data signal is a DOCSIS signal.

16. The method of scanning according to Claim 14, wherein the frequency value is a first frequency value, and wherein the scanning the first frequency value is followed by scanning a second frequency value to detect energy indicative of the digital data signal, if scanning of the first frequency value fails to detect energy indicative of the digital data signal.

17. The method of scanning according to Claim 16, further comprising scanning the second set of frequencies to attempt to detect the digital data signal, if scanning the first set of frequencies fails to identify the carrier frequency of the digital data signal.

18. In a cable modem, a method of scanning a plurality of frequencies within a channel to detect a carrier frequency of a digital data signal, comprising:
scanning a first set of frequencies to detect a digital data signal; and
scanning a second set of frequencies that are interleaved with the first set of
5 frequencies to detect a digital data signal, if the scanning the first set of frequencies fails to detect a digital data signal.

19. The method of scanning according to Claim 18, wherein the first set of frequencies includes a first frequency and a second frequency, the second frequency
10 being spaced from the first frequency by a predetermined amount.

20. The method of scanning according to Claim 19, wherein the first set of frequencies further comprises a third frequency, the third frequency being spaced from the second frequency by the predetermined amount.
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21. The method of scanning according to Claim 20, wherein the predetermined amount is a first predetermined amount, and wherein the second set of frequencies includes a fourth frequency and a fifth frequency, the fifth frequency being spaced from the fourth frequency by the predetermined amount, and the fourth
20 frequency being spaced from the first frequency by a second predetermined amount.

22. The method of scanning according to Claim 21, wherein the fifth frequency is spaced from the second frequency by the second predetermined amount.

23. A cable modem, comprising:
a tuner that is configured to scan a plurality of channels for a carrier frequency of a digital data signal, the digital data signal being received on one of a group of frequencies in one of the plurality of channels; and
a controller that is configured to control the tuner to sequentially scan
30 nonadjacent frequencies in the group of frequencies, wherein each scan of a nonadjacent frequency is capable of detecting energy indicative of the digital data signal from the nonadjacent frequency and from frequencies that are adjacent thereto.

24. The cable modem according to Claim 23, wherein the controller is further configured to control the tuner to scan the frequencies that are adjacent thereto to thereby identify a frequency at which the carrier frequency is located, in response to detecting energy indicative of the digital data signal from the nonadjacent
5 frequency and from frequencies that are adjacent thereto.

25. The cable modem according to Claim 23, wherein the controller is further configured to divide the group of frequencies into a plurality of sets of frequencies at which the carrier frequency may be located, wherein frequencies of
10 each set are interleaved with frequencies of other sets, and to control the tuner to sequentially scan the frequencies of each set.

26. The cable modem according to Claim 25, wherein the group of frequencies are divided into a first set and a second set, and wherein the frequencies
15 of the second set are interleaved with frequencies of the first set.

27. The cable modem according to Claim 25, wherein the group of frequencies are divided into a first set, a second set, and a third set, and wherein the frequencies of the second and third sets are interleaved with frequencies of the first
20 set.

28. The cable modem according to Claim 26, wherein a first frequency in the first set is adjacent second and third frequencies of the second set and wherein the controller is configured to control the tuner to scan the first frequency to detect a
25 digital data signal, and to scan the second and third frequencies in the vicinity of the first frequency, if scanning the first frequency results in detection of energy indicative of the digital data signal at the second or third frequencies.

29. The cable modem according to Claim 28, wherein the controller is
30 further configured to control the tuner to scan the second set of frequencies to attempt to detect the digital data signal, if scanning the first set of frequencies fails to identify the carrier frequency of the digital data signal.

30. A cable modem, comprising:

a tuner that is configured to scan a channel for a carrier frequency of a digital data signal within the channel, the channel including a set of potential carrier frequencies; and

5 a controller that is configured to control the tuner to sequentially scan a group of nonadjacent potential carrier frequencies selected from the set of potential carrier frequencies, wherein each scan of a nonadjacent potential carrier frequency is capable of detecting energy indicative of the digital data signal from both the nonadjacent potential carrier frequency and from potential carrier frequencies that are adjacent thereto.

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31. The cable modem according to Claim 30, wherein the controller is further configured to control the tuner to individually scan the frequencies that are adjacent thereto to thereby identify a frequency at which the carrier frequency is located, in response to detecting energy indicative of the digital data signal from the
15 nonadjacent frequency and from frequencies that are adjacent thereto.

32. The cable modem according to Claim 30, wherein the controller is further configured to divide the group of potential carrier frequencies into a plurality of sets, each of the sets comprising a set of discrete frequency values at which the
20 carrier frequency may be located, wherein discrete frequency values of each set are interleaved with discrete frequency values of other sets, and to control the tuner to sequentially scan the potential carrier frequencies of each set.

33. The cable modem according to Claim 32, wherein the group of
25 potential carrier frequencies are divided into a first set and a second set, and wherein the discrete frequency values of the second set are interleaved with discrete frequency values of the first set.

34. The cable modem according to Claim 32, wherein the group of
30 potential carrier frequencies are divided into a first set, a second set, and a third set, and wherein the discrete frequency values of the second and third sets are interleaved with discrete frequency values of the first set.

35. The cable modem according to Claim 33, wherein the discrete frequency values of the first set include a frequency value and wherein other frequency values are in the vicinity of the frequency value, and wherein the controller is configured to control the tuner to scan the frequency value to detect a digital data signal, and to incrementally scan the other frequency values in the vicinity of the first frequency value until the carrier frequency of the digital data signal is determined, if scanning the frequency value results in detection of energy indicative of the digital data signal.

36. The cable modem according to Claim 30, wherein the digital data signal is a DOCSIS signal.

37. The cable modem according to Claim 35, wherein the frequency value is a first frequency value, and wherein the controller is further configured to scan a second frequency value to detect energy indicative of the digital data signal, if the controller fails to detect energy indicative of the digital data signal during scanning of the first frequency value.

38. The cable modem for according to Claim 37, wherein the controller is further configured to control the tuner to scan the second set of frequencies to attempt to detect the digital data signal, if controller fails to identify the carrier frequency of the digital data signal during scanning of the first set of frequencies.

39. A cable modem, comprising:
a tuner that is configured to scan a plurality of frequencies within a channel to detect a carrier frequency of a digital data signal; and
a controller that is configured to control the tuner to scan a first set of frequencies to detect a digital data signal, and to scan a second set of frequencies that are interleaved with the first set of frequencies to detect a digital data signal, if scanning the first set of frequencies fails to detect a digital data signal.

40. The cable modem according to Claim 39, wherein the first set of frequencies includes a first frequency and a second frequency, the second frequency being spaced from the first frequency by a predetermined amount.

41. The cable modem according to Claim 40, wherein the first set of frequencies further comprises a third frequency, the third frequency being spaced from the second frequency by the predetermined amount.

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42. The cable modem according to Claim 41, wherein the predetermined amount is a first predetermined amount, and wherein the second set of frequencies includes a fourth frequency and a fifth frequency, the fifth frequency being spaced from the fourth frequency by the predetermined amount, and the fourth frequency being spaced from the first frequency by a second predetermined amount.

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43. The cable modem according to Claim 42, wherein the fifth frequency is spaced from the second frequency by the second predetermined amount.

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44. A computer program product that scans a plurality of channels in a cable modem for a carrier frequency of a digital data signal, the digital data signal being received on one of a group of frequencies in one of the plurality of channels, the computer program product comprising a computer-readable storage medium having computer-readable program code embodied therein, the computer program product comprising:

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computer-readable program code that is configured to sequentially scan nonadjacent frequencies in the group of frequencies, wherein each scan of a nonadjacent frequency is capable of detects energy indicative of the digital data signal from the nonadjacent frequency and from frequencies that are adjacent thereto.

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45. The computer program product according to Claim 44, further comprising:

computer-readable program code that is configured to scan the frequencies that are adjacent thereto to thereby identify a frequency at which the carrier frequency is located, in response to detects energy indicative of the digital data signal from the nonadjacent frequency and from frequencies that are adjacent thereto.

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46. The computer program product according to Claim 44, wherein the computer-readable program code that is configured to sequentially scan comprises:

computer-readable program code that is configured to divide the group of frequencies into a plurality of sets of frequencies at which the carrier frequency may be located, wherein frequencies of each set are interleaved with frequencies of other sets; and

5 computer-readable program code that is configured to sequentially scan the frequencies of each set.

47. The computer program product according to Claim 46, wherein the group of frequencies are divided into a first set and a second set, and wherein the
10 frequencies of the second set are interleaved with frequencies of the first set.

48. The computer program product according to Claim 46, wherein the group of frequencies are divided into a first set, a second set, and a third set, and wherein the frequencies of the second and third sets are interleaved with frequencies
15 of the first set.

49. The computer program product according to Claim 47, wherein a first frequency in the first set is adjacent second and third frequencies of the second set and wherein the computer-readable program code that is configured to sequentially scan
20 comprises:

computer-readable program code that is configured to scan the first frequency to detect a digital data signal; and

computer-readable program code that is configured to scan the second and third frequencies in the vicinity of the first frequency, if scanning the first frequency
25 results in detection of energy indicative of the digital data signal at the second or third frequencies.

50. The computer program product according to Claim 44, wherein the digital data signal is a DOCSIS signal.
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51. The computer program product according to Claim 47, further comprising computer-readable program code that is configured to scan the second set of frequencies to attempt to detect the digital data signal, if the computer-readable

program code that is configured to scan the first set of frequencies fails to identify the carrier frequency of the digital data signal.

52. A computer program product that scans a channel in a cable modem
5 for a carrier frequency of a digital data signal within the channel, the channel
including a set of potential carrier frequencies, the computer program product
comprising:

computer-readable program code that is configured to sequentially scan a
group of nonadjacent potential carrier frequencies selected from the set of potential
10 carrier frequencies, wherein each scan of a nonadjacent potential carrier frequency is
capable of detecting energy indicative of the digital data signal from both the
nonadjacent potential carrier frequency and from potential carrier frequencies that are
adjacent thereto.

15 53. The computer program product according to Claim 52, further
comprising:

computer-readable program code that is configured to individually scan the
frequencies that are adjacent thereto to thereby identify a frequency at which the
carrier frequency is located, in response to detecting energy indicative of the digital
20 data signal from the nonadjacent frequency and from frequencies that are adjacent
thereto.

54. The computer program product according to Claim 52, wherein the
computer-readable program code that is configured to sequentially scan comprises:
25 computer-readable program code that is configured to divide the group of
potential carrier frequencies into a plurality of sets, each of the sets comprising a set
of discrete frequency values at which the carrier frequency may be located, wherein
discrete frequency values of each set are interleaved with discrete frequency values of
other sets; and

30 computer-readable program code that is configured to sequentially scan the
potential carrier frequencies of each set.

55. The computer program product according to Claim 54, wherein the
group of potential carrier frequencies are divided into a first set and a second set, and

wherein the discrete frequency values of the second set are interleaved with discrete frequency values of the first set.

56. The computer program product according to Claim 54, wherein the
5 group of potential carrier frequencies are divided into a first set, a second set, and a third set, and wherein the discrete frequency values of the second and third sets are interleaved with discrete frequency values of the first set.

57. The computer program product according to Claim 55, wherein the
10 discrete frequency values of the first set include a frequency value and wherein other frequency values are in the vicinity of the frequency value, the computer program product further comprising:

computer-readable program code that is configured to scan the frequency
value to detect a digital data signal, and that is configured to incrementally scan the
15 other frequency values in the vicinity of the first frequency value until the carrier frequency of the digital data signal is determined, if the computer-readable program code that is configured to scan the frequency value detects energy indicative of the digital data signal.

58. The computer program product according to Claim 52, wherein the
20 digital data signal is a DOCSIS signal.

59. The computer program product according to Claim 57, wherein the
frequency value is a first frequency value, and further comprising computer-readable
25 program code that is configured to scan a second frequency value to detect energy indicative of the digital data signal, if the computer-readable program code that is configured to scan the first frequency value fails to detect energy indicative of the digital data signal.

60. The computer program product according to Claim 59, further
30 comprising computer-readable program code that is configured to scan the second set of frequencies to attempt to detect the digital data signal, when computer-readable program code that is configured to scan the first set of frequencies fails to identify the carrier frequency of the digital data signal.

61. A computer program product that scans a plurality of frequencies within a channel in a cable modem to detect a carrier frequency of a digital data signal, the computer program product comprising:

- 5 computer-readable program code that is configured to scan a first set of frequencies to detect a digital data signal; and
- computer-readable program code that is configured to scan a second set of frequencies that are interleaved with the first set of frequencies to detect a digital data signal, if the computer-readable program code that is configured to scan the first set of
- 10 frequencies fails to detect a digital data signal.

62. The computer program product according to Claim 61, wherein the first set of frequencies includes a first frequency and a second frequency, the second frequency being spaced from the first frequency by a predetermined amount.

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63. The computer program product according to Claim 62, wherein the first set of frequencies further comprises a third frequency, the third frequency being spaced from the second frequency by the predetermined amount.

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64. The computer program product according to Claim 63, wherein the predetermined amount is a first predetermined amount, and wherein the second set of frequencies includes a fourth frequency and a fifth frequency, the fifth frequency being spaced from the fourth frequency by the predetermined amount, and the fourth frequency being spaced from the first frequency by a second predetermined amount.

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65. The computer program product according to Claim 64, wherein the fifth frequency is spaced from the second frequency by the second predetermined amount.